which are altogether omitted, and the Cetacea, of which only a list is given. The seventy-five species of mammals are dealt with in an interesting manner, references being made to their habitat, food, care of young, change of coat, hibernation, &c. The common and Latin name of each species is given, and we are glad to note that where the Latin name has recently been changed the older and more familiar designation has also been added. The large number (442) of birds in the British list necessarily means that each can receive only comparatively short notice in the space available; nevertheless, a large amount of interesting information is packed into the twenty pages devoted to this part of the subject. The reptiles—three snakes, the blind-worm, and two lizards—and the Amphibia, seven in number, are described, with notes on their distribution and habits. The account of the fishes, which is restricted to those occurring in fresh water, also contains many interesting observations on their distribution, the distinctions between allied species, spawning, &c.

An appendix contains a full list of the species of vertebrates, other than turtles and marine fishes, which have been recorded from the British area. In the case of those birds which have occurred not more than six times notes are added or references given to the records of capture. The illustrations, about half of which are reproduced from photographs, are good, and several are of special excellence. The volume forms a thoroughly serviceable guide to the collection.

The Sea-Kings of Crete. By the Rev. James Baikie. Pp. xiv+274. (London: A. and C. Black, 1910.) Price 7*s.* 6*d.* net.

As a compilation this work shows great diligence; it has evidently been written *con amore,* and its aim is most praiseworthy; but it has no scientific value. We prefer to see *œuvres de vulgarisation* of this kind written, when possible, by the excavators themselves. This is no doubt a counsel of perfection; they have usually too much to do to write popular books. But in any case, such books should only be written by trained archæologists with a first-hand knowledge of the subject and a personal acquaintance with Crete itself. Of these qualifications we do not see much evidence in Mr. Baikie's work, which, after the publication of the books of Mrs. Hawes (a Cretan excavator) and Prof. Burrows, seems scarcely needed.

Pinro. (Brook's patent.) (W. J. Brooks and Co., Letchworth, Herts.) Price 1*s.* per twelve yards.

THIS device consists of a thin metal tape, from which fine steel points project at intervals of about four inches. It is intended to be used by draughtsmen as a substitute for drawing-pins, and also for attaching canvas, posters, fabrics, &c., continuously along the edges. The contrivance does not seem to us likely to be generally adopted, but there are special circumstances under which it might be found very serviceable.

Teachers' Notes on Nature-Study: Plants and Animals. Pp. viii+232. (London: Blackie and Son, Ltd., n.d.) Price 1*s.* 6*d.* net.

THIS re-issue of an old work will not commend itself to teachers who desire to make the school study of science a training in accurate observation, simple reasoning, and precise expression. The method of teaching, the haphazard arrangement of subjects, and the general absence of scientific treatment, all remind the reader of the discredited style of "object-lesson" common ten or fifteen years ago. The compiler, whose name is withheld, does not appear to realise the necessity in the case of young pupils for basing every lesson on plants upon specimens in the hands of each child, and encouraging the children to draw from the specimen rather than from the teacher's blackboard sketches.

The Scientists' Reference Book and Pocket Diary for 1911. (Manchester: J. Woolley, Sons and Co., Ltd.) Price 1*s.* 6*d.*; bound in morocco, 2*s.* 6*d.*

IN addition to a handy diary in which provision is made also for memoranda and addresses, this publication provides a very useful book of tables and facts likely to be of use to workers in science, as well as to students. In view of its small price the combination is likely to secure a wide popularity.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

Historical Note on Recalescence.

THE interesting *résumé* of Prof. Arnold's British Association paper on recalescence, which appeared in NATURE for December 1, contains the following statement in the opening paragraph:—

"In 1868 the late Dr. Geo. Gore, F.R.S., discovered the recalescent points now known as Ar_3 and Ar_2, and in 1872 Prof. W. F. Barrett, F.R.S., discovered the recalescent point Ar_1, which is now known as the carbon change point. Prof. Barrett gave the phenomena the generic title of 'recalescence,' by which they have been known ever since."

As no little misapprehension exists on this subject, it is desirable, as a matter of historical accuracy, to state that Dr. Gore did not discover the phenomenon of *recalescence,* but he was the first to observe the remarkable momentary elongation of an iron wire during cooling from bright incandescence, which important observation subsequently led to the discovery of recalescence.

Owing to the great practical importance which recalescence has assumed in the hardening and heat treatment of steel, it may perhaps be of interest if I briefly state the early history of this discovery.

The Proceedings of the Royal Society for January 28, 1869, contains a paper by Dr. Gore which records the anomalous behaviour of cooling iron above referred to—its sudden transient expansion at a dull red heat. This anomalous behaviour Dr. Gore found was not shared by other metals, and he states that no reverse effect was noticed upon heating iron wire to incandescence.[1]

Some two years later, having to deliver a lecture before the Royal Dublin Society on the "Molecular Changes that accompany the Act of Magnetisation," I was anxious to show Mr. Gore's interesting discovery, as it appeared likely to be connected with the resumption of the magnetic state in iron when cooling from a white heat. In answer to my inquiry Mr. Gore kindly furnished me with his apparatus, and as he said he had no further use for it I purchased it from him, and it is still in my possession. To make the effect visible to a large audience a mirror was attached to the spindle which moved the index, and from it a ray of light was reflected to a distant scale. This device revealed the fact, overlooked by Dr. Gore, that a small momentary *contraction* of the iron wire took place during its heating to incandescence, approximately at the same temperature at which the momentary elongation occurred in cooling.[2]

Dr. Gore having informed me, in a letter dated May, 1872, that he was not pursuing his original observation and that the subject was quite open to anyone, I felt at liberty to continue the inquiry. Accordingly, the following year, Dr. Guthrie having kindly placed his laboratory

[1] In fact some eighteen months after his original observation Dr. Gore states in a paper published in the *Phil. Mag.* for September, 1870 (the italics are his):—"The iron during cooling . . . suddenly elongated by diminution of cohesion . . . a corresponding but reverse phenomenon did *not* occur during the process of *heating* the wire."

[2] This lecture was repeated at the London Institution a year later, and a full report of it is published in the Journal of that Institution.

at South Kensington at my disposal, an investigation was begun, which led to the discovery of recalescence on September 12, 1873. On that date I noticed that accompanying the Gore effect in cooling iron, and at the same critical temperature, a sudden reheating or *after glow* occurred. It was more difficult to detect the reverse effect on heating, but a momentary arrest of the heating appeared to occur at the critical temperature. The Chatelier thermo electric pyrometer was unknown at that time, and I had to have recourse to an air thermometer, which showed that the after glow was not an optical illusion, but a real, though transient, accession of temperature, due to a liberation of latent heat and not to surface oxidation of the iron, as was shown by the recalescence occurring as strongly in an atmosphere of nitrogen or other inert gas as in air. Furthermore, this effect appeared to synchronise with the critical temperature at which iron lost on heating and regained on cooling its magnetic power, and with the remarkable thermo-electric inversion in iron which Prof. Tait had then recently discovered. I noticed, also, that a crepitation occurred in the iron at this temperature resembling the Page effect on magnetising iron.

These and other observations were described, and the experiments exhibited at the British Association meeting at Bradford a few weeks later, September, 1873, and the paper was published in the *Philosophical Magazine* for December, 1873.[1] An interesting discussion on recalescence followed the reading of my paper, in which Prof. Clerk Maxwell, Mr. Herbert Spencer, Prof. Carey Foster, and others took part. This was reported in the local papers at the time, and happily is preserved in a number of the now defunct *Quarterly Journal of Science*.[2]

Later on a British Association Committee was appointed to report on the whole subject, Prof. Geo. Fitzgerald being chairman and myself secretary. Unfortunately, a long delay occurred in the publication of the report, partly owing to my removal to Dublin and the pressure of work in the chair to which I was appointed; meanwhile, the subject was greatly enriched by the researches of others, especially by M. Osmond, who in 1886 made it the starting point of his classical investigations. An interim report by the British Association Committee was, it is true, published, but I would specially refer to the final lengthy report published in the Proceedings of the British Association for 1890, which had the advantage of Prof. Geo. Fitzgerald's cooperation, he having witnessed and corroborated some of the earlier experiments described therein. It is there shown that in 1875 two recalescent points were found, most markedly in steel wire, "the second and far stronger after glow being exactly coincident with the sudden elongation of steel wire during cooling" (the Gore effect). As that report is easily accessible, I will not refer to the other observations it contains. Amid the large literature on this subject which has grown up attention should be directed to an excellent investigation by a Swede, Dr. G. E. Svedalius, on the "Measurement of the Anomalous Changes in the Length and Temperature of Iron and Steel during Recalescence"; this was communicated by Prof. Geo. Fitzgerald to the *Philosophical Magazine* for August, 1898.

With regard to the allotropic form of iron which appears to be produced at high temperatures—Osmund's β iron—and the liberation of the latent heat of allotropy during cooling causing recalescence, I may point out that Prof. Tait, from his thermoelectric researches, had been led to the conclusion, as stated in his Rede lecture in 1873, "that iron becomes a different metal on being raised above a red heat." But I believe Prof. Geo. Forbes was the first to suggest and publish the fact that recalescence might be due to the liberation of the latent heat of an allotropic form of iron. Writing to me upon my experiments on April 18, 1874, he remarks:—"It would follow that iron heated to an intense white heat assumes an allotropic form, and that at this temperature [of recalescence] when cooling it changes to the other form and gives off latent heat."

In conclusion, let me congratulate Prof. Arnold upon his investigations, extending over so many years, and the light he has thrown on the causes of the different phases of recalescence and the importance of the carbon change point. No doubt he is aware that M. Svedelius, in the paper referred to above, also experimented with electrolytic iron. Referring to the expansion at the critical temperature, Svedelius says:—"In a rod of electrolytic iron the magnitude of the expansion at D_1 decreased very rapidly with every renewed heating, and after the fiftieth heating no trace either of the critical point D or D_1 could be discovered"; and he adds in a footnote:—"This confirms the statement made long ago by Prof. Barrett that in very pure iron the anomalous contraction and expansion could be 'washed out,' as it were, by repeated heating and cooling." I do not know whether Prof. Arnold has experimented with a very low carbon "burnt iron" to ascertain whether any recalescent points remain in such iron.

W. F. BARRETT.

Kingstown, co. Dublin, December.

1 "On Certain remarkable Molecular Changes occurring in Iron Wire at a Low Red Heat. *Phil. Mag.*, December, 1873, p. 472; see also my paper in the following number of the *Phil. Mag.*

2 Upon the publication of my paper in the *Phil. Mag.*, Dr Gore wrote to me as follows, in a letter dated Edgbaston, December 22, 1873:—"Your new discoveries respecting the molecular changes in iron, described in the *Phil. Mag.* for this month, have greatly pleased me; especially the sudden development of heat attending the elongation during cooling, and the sudden shortening during heating." Furthermore, when Sir Roberts-Austen in a lecture before the British Association in 1889 made much the same error as that quoted at the beginning of this note, Dr. Gore at once wrote to me and expressed his great surprise that the discovery of recalescence should be attributed to him.

Captain Cook Memorial.

UNDER the auspices of the British Empire League, a very representative and influential committee has been formed to carry out the proposal made by Sir Joseph Carruthers, K.C.M.G., ex-Premier of New South Wales, that a monument should be erected in London to the memory of Captain Cook; but I venture to ask, is this the best way to honour the memory of the illustrious navigator? Captain Cook was a great seaman, geographer, and ethnologist; indeed, he was one of the foremost of the men of science of his day. As his life was devoted to discovery of various kinds, surely the best memorial to him would be to establish a fund, associated with his name, the interest of which should be devoted to the prosecution of investigations analogous to those in which he spent his life and met his death.

Cambridge, December 13.

A. C. HADDON.

Accuracy of Time on Magnetograms.

I AM greatly interested by Dr. Krogness's letter in NATURE of December 8 directing attention to this matter. We have been investigating this point for some time by interrupting both trace and base line in our Adie magnetographs.

We find that, in general, if the times are taken from the base line we should actually get declination for about two minutes later, but horizontal force and vertical force for two minutes earlier. The error is probably not constant, and so we have decided to interrupt the trace. It may be of interest to say that we have been able to reduce the interruption to one minute, which corresponds to $\frac{1}{4}$ mm. on the paper.

GEORGE W. WALKER.

The Observatory, Eskdalemuir, Langholm,
Dumfriesshire, December 19.

The Quadrantid Meteor Shower.

IF the maximum of this meteor shower should occur when the earth is in the same position with regard to the sun as was formerly the case, it would take place in the daytime of January 3, 1911, but this shower does not seem to have been sufficiently watched of late years to ascertain when the maximum now occurs. There is, however, some reason to believe that it will not be until the evening of January 3, in which case, as there is no moonlight, it would be a very favourable opportunity for its observation in this country. As the maximum is of short duration it ought to be more extensively watched for annually than appears usually to be the case.

T. W. BACKHOUSE.

West Hendon House, Sunderland, December 13.